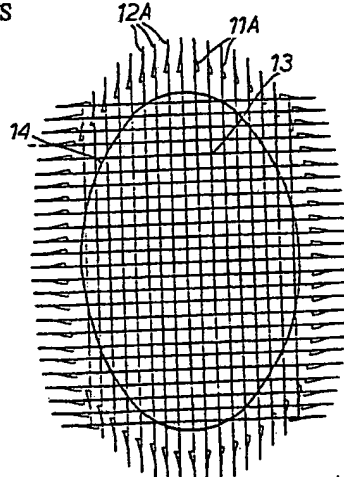
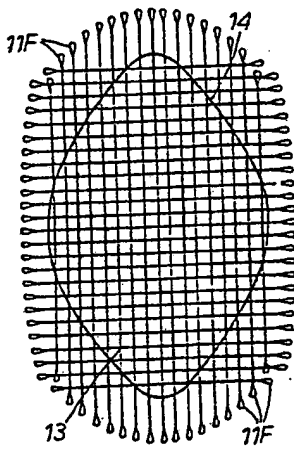
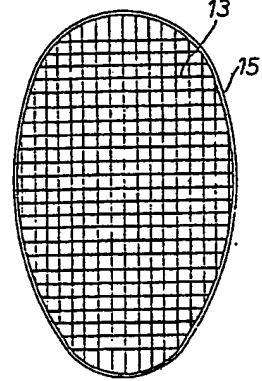
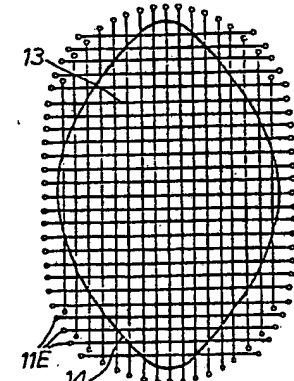


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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification<sup>3</sup>: A63B 49/02, 49/06, 51/00, 51/02</p>	<p>A1</p>	<p>(11) International Publication Number: WO 81/03431 (43) International Publication Date: 10 December 1981 (10.12.81)</p>
<p>(21) International Application Number: PCT/AU81/00066 (22) International Filing Date: 2 June 1981 (02.06.81) (31) Priority Application Numbers: PE 3837 PE 6561 (32) Priority Dates: 2 June 1980 (02.06.80) 20 November 1980 (20.11.80) (33) Priority Country: AU (71) Applicants; and (72) Inventors: MCMAHON, Marshal, Anthony [AU/AU]; 2 Carss Place, Charnwood, A.C.T. 2615 (AU). NAPIER, Ewan, Douglas [AU/AU]; 27 Robertson Street, Curtin, A.C.T. 2605 (AU). (74) Agents: DUNCAN, Alan, David et al.; Davies &amp; Collison, A.M.P. Building, Hobart Place, Canberra City, A.C.T. 2601 (AU).</p>		<p>(81) Designated States: AT (European patent), AU, DE (European patent), FR (European patent), GB (European patent), JP, NL (European patent), SE (European patent), US.  Published With international search report</p>
<p>(54) Title: RACQUET STRINGS AND RACQUETS</p> <p>(57) Abstract</p> <p>Strings are provided for use in racquets for sports such as tennis, squash, badminton, racquetball and the like. The strings have a main section of string (10A, 10B, 10C, 10D, 10E, 10F) with a string retaining means (11A, 11B, 11C, 11D, 11E, 11F) located at or near each end of the string. Some forms of string may be fitted to conventional racquet frames. Others require novel racquet head frame constructions. The strings may also be formed as a woven mesh (13), for fitting to a racquet head. One form of mesh (13) has a peripheral loop (15) to enable it to be fitted into a racquet head containing a groove (25a, 25b, 32), a series of hooks (40) or a C-shaped channel member (41). Other racquet head constructions include head frames fitted with slots (33, 34, 35, 37), and head frames formed as two head members (60, 61) containing interlocking projection members (64) and projection receiving members (65). Dismantleable racquets, string dampeners and replaceable racquet grips are also disclosed, as are racquets produced by the moulding of the racquet frame around a mesh of strings.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;">     </div>		

TITLE"RACQUET STRINGS AND RACQUETS"TECHNICAL FIELD

5 This invention concerns racquets of the type used in the sports of tennis, badminton, squash, racquet-ball and the like. In particular, it concerns strings for use in such racquets, and racquet frames and racquets of novel construction.

BACKGROUND ART

10 Racquets used in tennis, squash, badminton and racquet ball have changed very little since these games were devised. Racquets are still produced by the long-established method of making a racquet frame, then "stringing" the racquet. The "stringing"  
15 of the racquet has always been a labour-intensive task requiring both manual dexterity and acquired skills. Even an expert, using the latest equipment that is available, takes from 30 to 45 minutes to string (or re-string) a racquet. Consequently, racquet stringing  
20 and racquet re-stringing has long been an expensive operation.

25 Part of the skill in stringing a racquet is in knowing how much tension to apply to a string. To apply too little tension results in a "dead" racquet being produced. To over-tension the string is to risk stretching the string beyond its elastic limit, and breaking the string (with the attendant waste in time of having to begin to string the racquet again) or damaging the racquet by over-tensioned strings.

DISCLOSURE OF THE INVENTION

30 One objective of the present invention



extends only to the point 69 of the rib. A small block 70 of any suitable material (including a resilient, compressible material) fits inside the channel member, and is held in the location of the slot 68 by a pair of lugs 71, which fit into the slot. A string 72 will be clamped by the rib at point 69 and the top of block 70 when the head frame members of Figure 8 are fully interlocked.

Figure 9 illustrated seven schematic sectional views of alternative constructions of the racquet head embodiment of Figures 6, 7 and 8, with the head frame members partly intermeshed. The main bodies of the racquet head frame members of Figure 9 are rectangular in cross-section (Figure 9(a)), half-annular in cross-section (Figure 9(b)), any required complex shape (Figure 9(c)), or are formed as box sections (Figures 9(d) to 9(g)).

From the foregoing description, it should be apparent that the various techniques for "stringing" a racquet that are mentioned and/or described above may be used with a racquet head frame made from main bodies of the form illustrated, in several (non-exhaustive) configurations, in Figure 9.

Yet other variations of the racquet head frame constructions described above are possible, without departing from the present inventive concept. For example, the clamping of the strings of the racquet between the racquet head frame sections may be effected by constructing the head frame with a cross-section of the form illustrated in Figure 9, but with the inner flanges of the head frame members of the racquet (in the case of constructions of the type illustrated in Figures 9(a) to 9(c)), or the inner regions of the opposing faces of the head frame sections (in the case of constructions of the type illustrated in Figure 9(d) to 9(g)), constructed in such a manner that they form a clamp for the strings of the

racquet. This clamp arrangement may comprise a pair of planar surfaces, formed one on each of the head frame sections. Alternatively the clamp arrangement may comprise cooperating opposed surfaces (such as a concave surface on one racquet head frame section forming a clamp with a convex surface of the other head frame section), or a pair of matched corrugated surfaces. Another alternative is for the clamping arrangement to comprise a series of smaller clamping regions, each adapted to clamp one string of the racquet or a small plurality of strings of a racquet. There are clearly many alternative clamping arrangements which may be used in this manner, and if required, they may utilise glue or be effective only when screws joining the racquet head frame members are tightened.

Referring now to Figure 10, a racquet is illustrated which is formed of three parts, namely a head member 80, a neck member 81 and a grip member 82. The individual parts are formed to fit together using the equivalent of a tongue-and-groove arrangement 84, 86. The "tongue" of the head member 80 is threaded at 85 to receive the threaded end of a metallic rod 83 which is adapted to pass through colinear cylindrical bores 87, 88 formed in neck member 81 and grip member 82, respectively. Note that bore 88 has a short, wider-diameter region 89 at its end remote from neck member 81, into which the enlarged end of metal rod 83 fits.

Other means of rigidly interconnecting the three parts of the racquet may, of course, be used.

The advantage of this type of racquet is that if any part of the racquet is damaged, it may be quickly replaced at considerably less expense than the cost of a new racquet. Furthermore, the racquet may be dismantled for better packing when being transported (particularly when parcelled for sending by mail) and it is possible for



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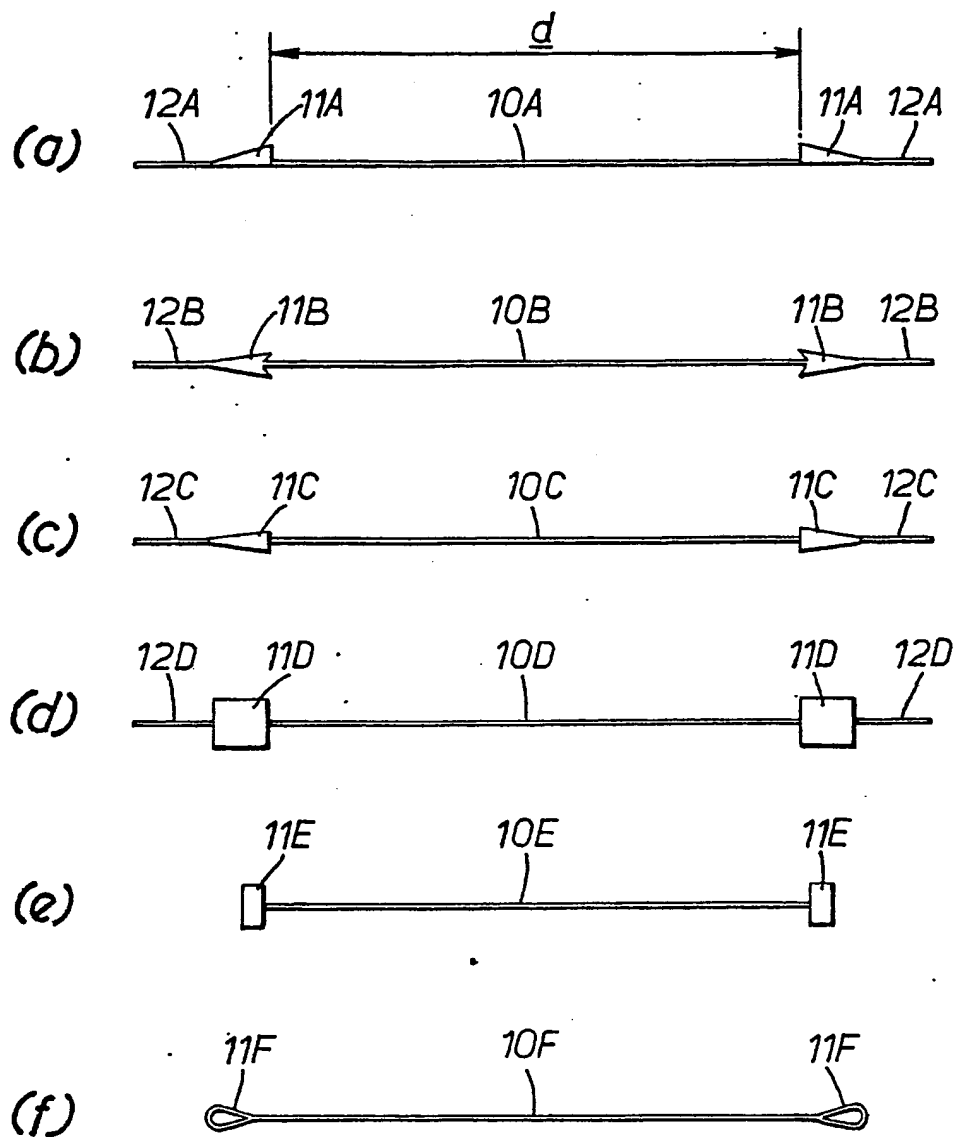


FIG. 1.

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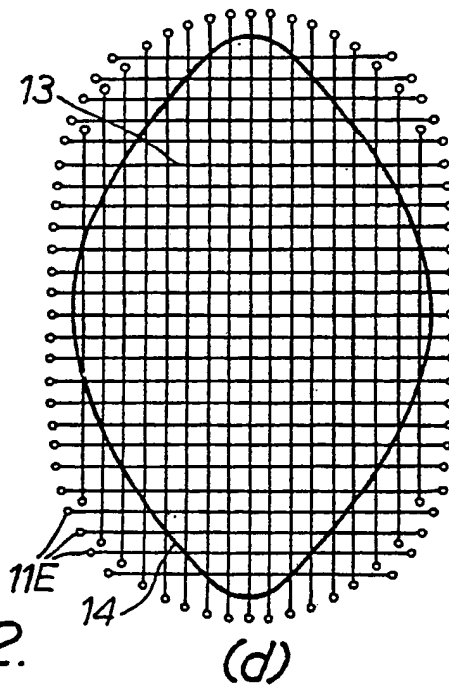
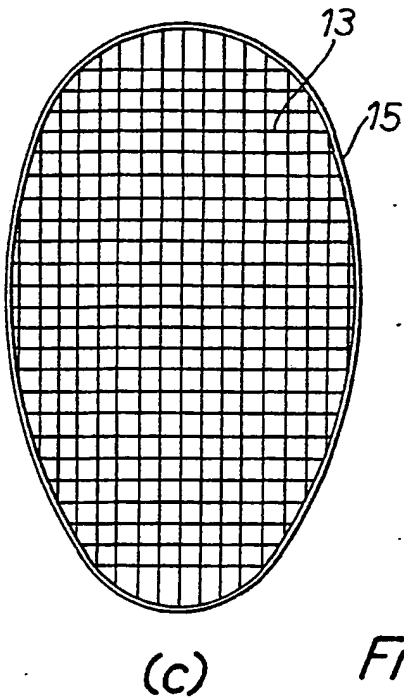
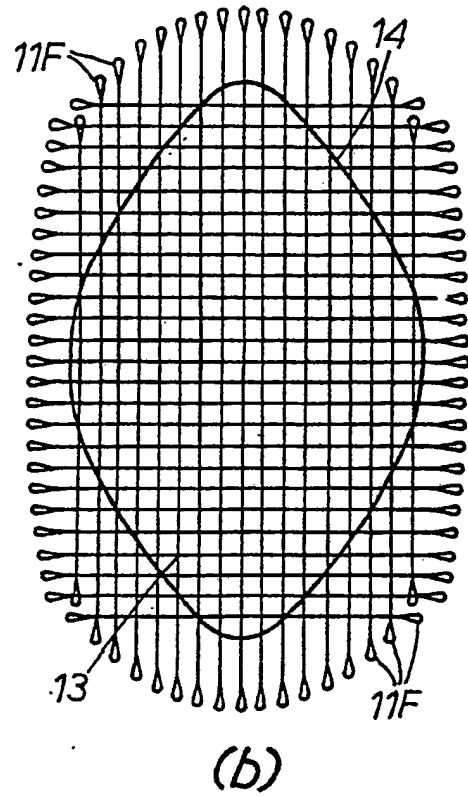
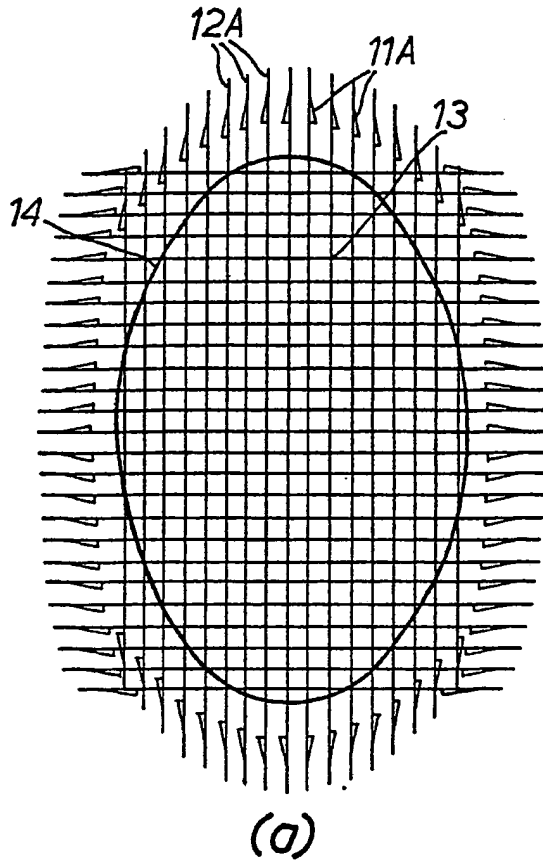
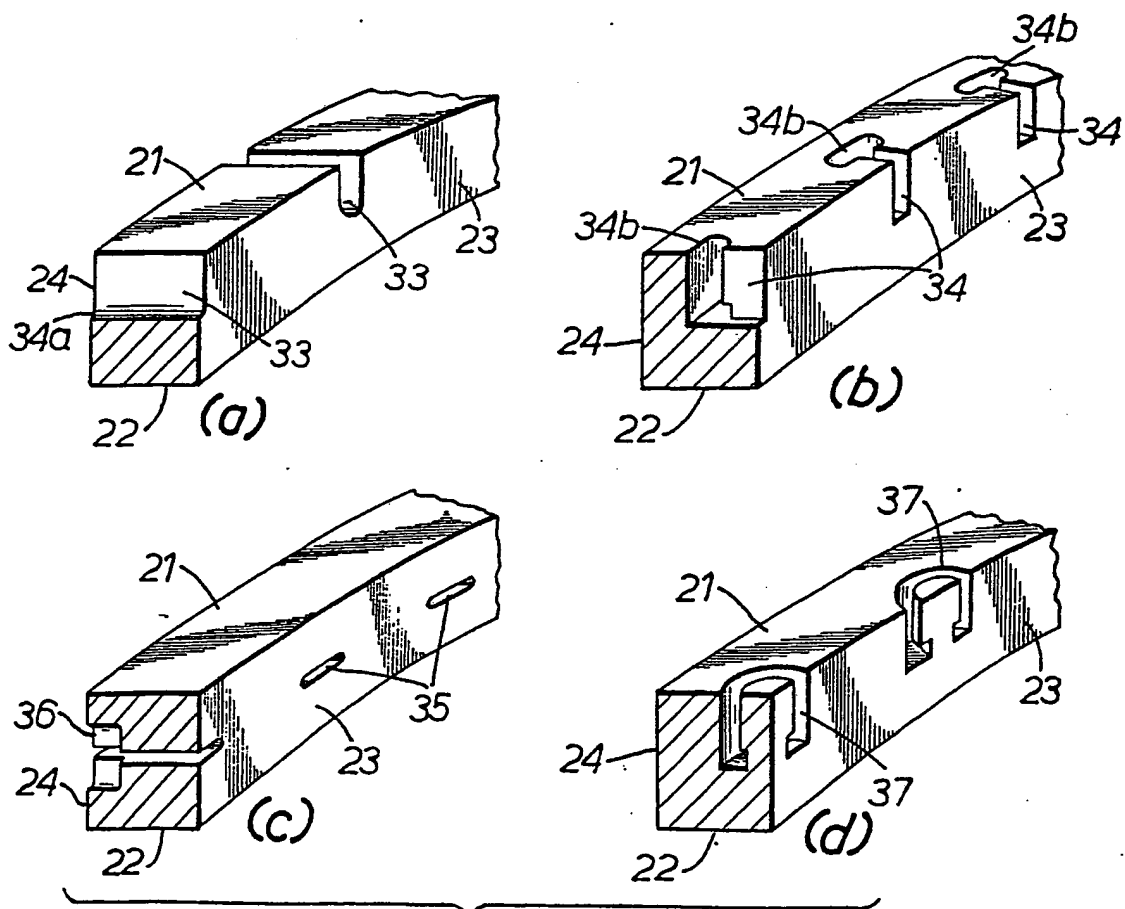
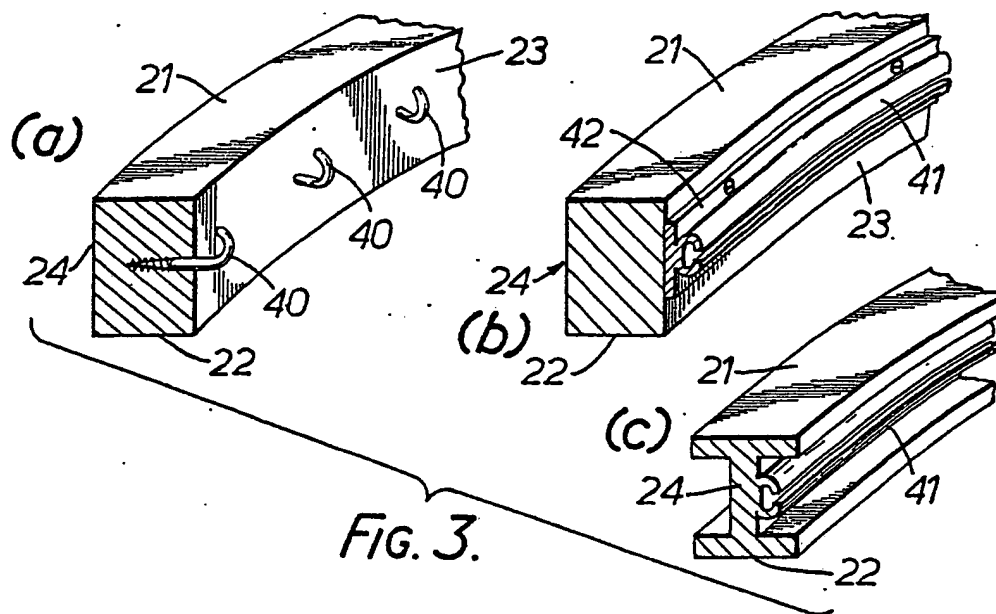


FIG. 2.

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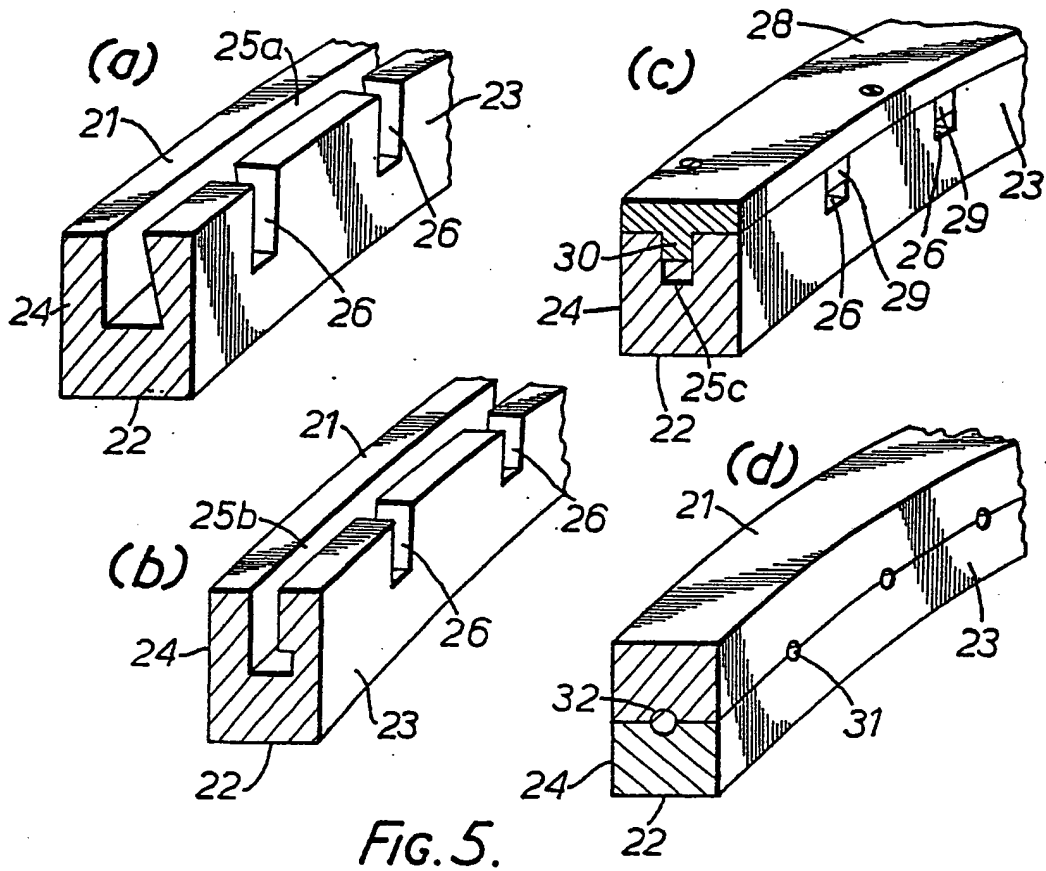


FIG. 5.

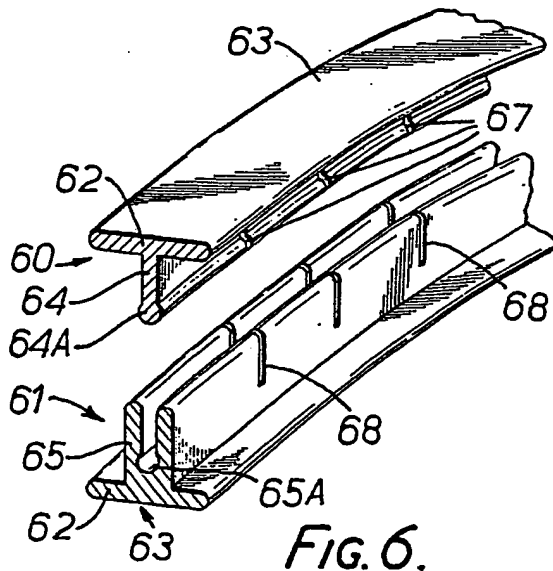


FIG. 6.

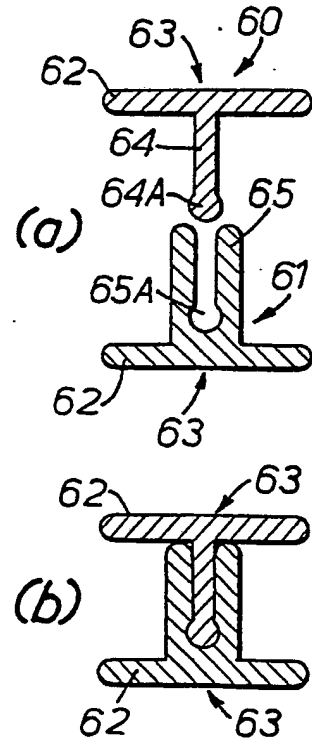
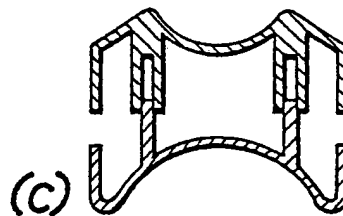
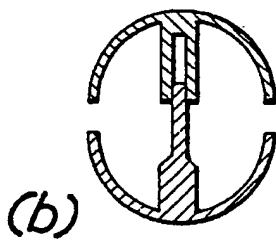
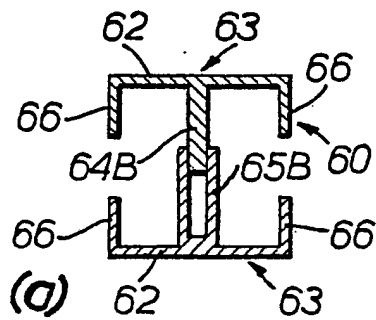
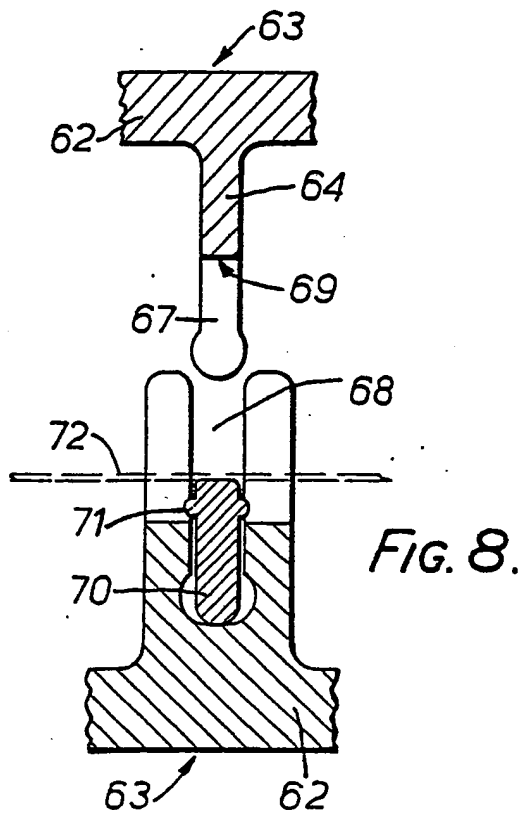
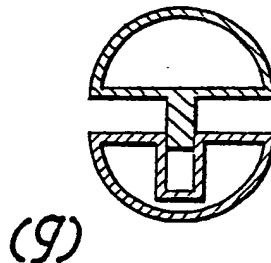
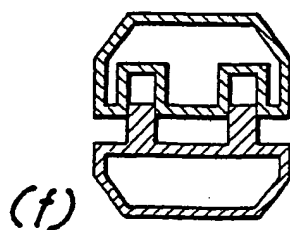
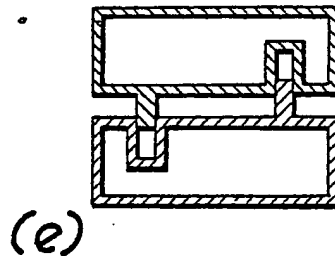
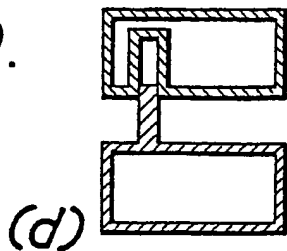


FIG. 7.

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**Fig. 9.**



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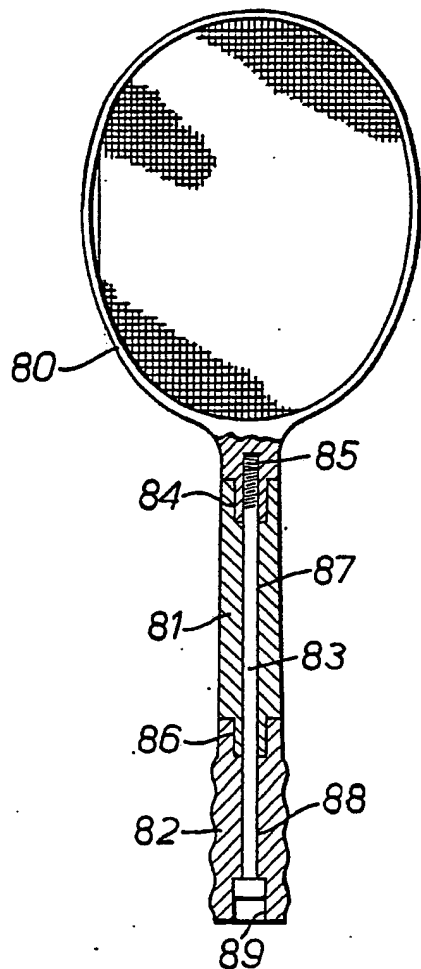


FIG. 10.

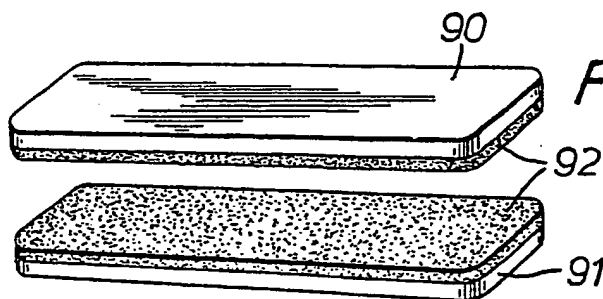


FIG. 11.

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